gration and the supposed sinking of the ice.

In Lake Mendota the mean temperature of the water immediately after the disappearance of the ice is about 2.7°, as the result of the average of seven years. It has never been above 3.5° at that time. It rarely happens that the bottom water and mud at 22 m. (the deepest water) reaches 4° before the ice disappears.

The water derived from melting snow and ice remains just below the ice, floating on the water of the lake. It becomes warmed by the sun's rays and often rises considerably above 4°. It is lighter than the lake water, having less dissolved matter, and the increase of density as the temperature rises from 0° to 4° is not sufficient to carry it down into the lake water. Immediately below the ice there is a very steep temperature gradient to the maximum and a somewhat slower decline below. The maximum usually comes about 0.5 m. below the under side of the ice. I give a series taken April 3, 1901, when the ice was about 30 cm. thick. The distances are measured from the surface of the water.

Depth	Temperature
In hole through ice	0.2°
40 cm.	3.8°
50 "	4.5°
60 "	5.5°
75 "	5.9°
100 "	5.5°
125 "	4.0°
150 "	2.5°
2 m.	2.3°
10 "	2.2°
15 "	2.4°
18.5 m.	2.8° bottom.

The ice went out April 11; on that day the temperature at 2 m. and below had not changed materially. Facts similar to these appear every year.

If a lake contains little or no dissolved matter the snow water would mingle more freely with it than in a lake like Mendota, and the rise of temperature in the surface stratum might not be so marked; although it would hardly be absent altogether. But if no surface rise occurred, I see no reason why the thawing of the ice should wait until the water below the ice has reached the temperature of 4°. From 60 per cent. to 80 per cent. of the sun's energy is delivered directly to the ice in any case, and is employed in melting it, and dissecting it into crystals. As soon as this process has gone far enough to loosen the crystals from each other they will fall apart, regardless of the temperature of the underlying water. It is always possible that the ice will disappear in this way, "all at once and nothing first"; but I have never known it to do so; in Lake Mendota a wind has been the agent which has shattered the last hold of the crystals on each other and converted the sheet of ice into a mush of crystals rapidly melting in the warmer water.

Professor Barnes thinks that much of the later part of the melting of the ice comes from the warm water below it. I have never seen evidence that such is the case. Unless the water below the ice is warmer than 4° there would be a non-conducting layer of colder water constantly between the ice and the warmer water. If the temperature rose above 4°, convection currents might be set up which would subtract heat from the ice. But at a temperature near 4° the convection efficiency is very small and the currents would be weak, especially under the peculiar stratification which obtains below the ice. From another point of view the same conclusion can be drawn. Not more than 100–125 gr. cal. per sq. cm. per day can possibly get through the ice into the water; and only part of this can be used in melting the ice.

E. A. Birge

Madison, Wis.,
June 13, 1910

THE EFFECTS OF DEFORESTATION IN NEW ENGLAND

To the Editor of Science: In their enthusiasm for the conservation of our forests the lecturers and writers on that subject have often been guilty of an over-statement of their case in an endeavor to show that not only are the forests rapidly disappearing but as a result of their removal the land itself is being

speedily and almost totally ruined. The cases cited and the illustrations shown to prove the contention are, for the most part, taken from non-glaciated regions where the soil is, in general, a loose homogeneous residual sand or clay such, for example, as in Kentucky and North Carolina, or homogeneous, incoherent sediments such as occur on our eastern coastal plain; the implication being that this effect is universal. In the regions cited there seems to be no question that the erosive power of the streams has been greatly increased as the vegetal covering has been removed and that large areas, formerly more or less fertile, have become so gullied and denuded of their soil as to render them of little value.

In New England, however, this is true only to a very limited extent. In the Berkshires of western Massachusetts, where the relief is so strong that landslides occasionally occur, one often sees a mountain side so thoroughly denuded of its trees and brush that at a distance it looks like a hay field with the hay in windrows. Under such conditions—a steep slope and lack of vegetation—the conditions are extremely favorable for erosion. However, in spite of these conditions, the mountain streams are beautifully clear except immediately after a heavy rain and are never like the muddy streams of the southern Appalachians where erosion is proceeding rapidly.

The reason for this difference in the amount of erosion under similar conditions of slope and vegetation between glaciated New England and the non-glaciated regions to the south is to be found in the soil and climate. The heterogeneous character of the till of New England is not favorable to erosion because the pebbles and boulders of the till are constantly diverting the water of the run off and are, consequently, lessening its velocity; and also because after gullying has begun the bottom of the gully is protected from further excessive erosion by the pavement of stones derived from the till in which it was cut. Moreover, the moister climate of New England favors a rapid growth of vegetation which soon again binds the soil. In many places in the Berkshires and in Vermont and New Hampshire mountain slopes which rise from 700 to 1,000 feet in one quarter of a mile have been several times stripped of their forest growth with little, though doubtless some, injury to the soil.

HERDMAN F. CLELAND
WILLIAMSTOWN, MASS.,
June 24, 1910

QUOTATIONS

THE FIGHT ON THE COLLEGES

"THERE is no spectacle in American life to-day more pitiful than the contrast between what the college advertises to do and what it performs." "The teaching by our college professors is the poorest in the country." "The average third-year boy in the high school is more able to think, discuss, and express an idea than the average college student two years older." "The young man learns in college that he need not work, he comes to regard his college as a social and sporting club." "Colleges with their narrow and false ideals of culture, . . . their denomination has reached a degree of intolerable impertinence." "The high schools in desperation have been drawing a line of cleavage between those fitting for college and those who are not. This is unnecessary, unfitting and undemocratic."

These are not extracts from an article in a muckraking magazine; they are taken from two addresses delivered yesterday at the meeting of the department of secondary education of the National Education Association in Boston; one by the principal of a New York high school, the other by the state superintendent of public schools in Wisconsin. What was in view in the last of the above quotations may be judged from a resolution almost unanimously adopted at the meeting, declaring in favor of the recognition as electives in college-entrance requirements "of all subjects well taught in the high schools"; some of the subjects especially mentioned in the preamble being manual training, "commercial branches," and agriculture, and the requirement of two languages other than English being expressly objected to. And the situation presented both by the addresses